

## SECTION 16530

### EMERGENCY LIGHTING SYSTEM

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#### **LANL MASTER CONSTRUCTION SPECIFICATION**

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the LEM Electrical POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within "stars" during editing.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Unit emergency lights.
- B. Fluorescent emergency ballasts.
- C. Exit signs.

##### 1.2 LANL PERFORMED WORK

- A. None

##### 1.3 SUBMITTALS

- A. Submit the following in accordance with Section 01330:
  - 1. Catalog Data: Submit catalog data describing emergency lighting. Include data substantiating that materials comply with specified requirements. Arrange data for luminaires in the order of fixture designation.
  - 2. Performance Curves/Data: Submit certified photometric data for emergency lighting units.
  - 3. Warranty: Submit warranties for emergency lighting units and exit signs.
  - 4. Maintenance Instructions: Submit maintenance instructions for inclusion in the operating and maintenance manuals.

#### 1.4 ENVIRONMENTAL REQUIREMENTS

- A. Provide emergency lighting units and exit signs suitable for operation at an altitude of 7500 feet above sea level.
- B. For ambient temperature limits, refer to the specific product specification in Part 2.

#### 1.5 SPARE MATERIALS

- A. Furnish the following extra materials matching products installed. Package the extra materials with protective covering for storage and identify with labels describing contents.
- B. Lamps: Provide 10 percent of quantity of lamps of each type, but no fewer than two lamps of each type.

#### 1.6 QUALITY ASSURANCE

- A. Comply with ANSI/NFPA 70 - *National Electrical Code* and NFPA 101 - *Life Safety Code* for components and installation.
- B. Provide emergency lighting units and exit signs that are UL 924 listed and labeled for their indicated use and location on this project.
- C. Use manufacturers that are experienced in manufacturing emergency lighting units similar to those indicated for this Project and have a record of successful in-service performance.

#### 1.7 WARRANTY

- A. Emergency Lighting Units: Submit a warranty, mutually executed by the manufacturer and the installer, agreeing to replace emergency lighting units that fail in materials or workmanship within five years, beginning on the date of manufacture. This warranty is in addition to, and not a limitation of, other rights and remedies LANL may have under the Contract Documents.
- B. LED Exit signs: Submit a warranty, mutually executed by the manufacturer and the installer, agreeing to replace LED exit signs that fail in materials or workmanship within five years, beginning on the date of substantial completion. This warranty is in addition to, and not a limitation of, other rights and remedies LANL may have under the Contract Documents.

#### 1.8 RECEIVING, STORING AND PROTECTING

- A. Receive, store, and protect, and handle products according to NECA 1—*Standard Practices for Good Workmanship in Electrical Construction*.

## PART 2 PRODUCTS

### 2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Refer to Section 01630.

### 2.2 FLUORESCENT EMERGENCY BALLAST

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**NOTE: Use fluorescent emergency ballast for indoor dry locations with a temperature range of 32 to 130 degrees F. Do not use in supply-air luminaires that provide heating. Fluorescent emergency ballasts may be used instead of wall-mounted emergency lighting units in areas with fluorescent luminaires.**

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- A. Furnish a UL 924 listed, self-diagnostic, fully automatic, fluorescent emergency ballast in each luminaire indicated on the Drawings.
- B. The normal fluorescent luminaire ballast will operate the lamps during normal conditions.
- C. Provide fluorescent emergency ballast that is connectable for operation at either 120 or 277 volts.
- D. Provide fluorescent emergency ballast that contains a 6 volt, maintenance-free, sealed high-temperature nickel-cadmium or nickel-metal hydride battery. Upon interruption of normal AC power the internal controller shall automatically switch the emergency lighting load to the battery. The ballast shall supply a total of 1350 lumens of emergency illumination for a minimum of 90 minutes using one or two F32T8 lamps.
- E. Provide fluorescent emergency ballast with a self-diagnostic system that meets the requirements of NFPA 101:
1. Automatically perform a self-test of battery and lamps for at least 30 seconds at intervals not exceeding 30 days.
  2. Automatically perform a self-test of battery and lamps for at least 90 seconds at intervals not exceeding 6 months.
  3. Any failure shall be indicated by a status indicator.
- F. Fluorescent emergency ballast shall provide exterior indication of AC power status, all self-diagnostic test cycles, and unit malfunctions.
- G. Provide a 5 year full warranty on the fluorescent emergency ballasts.
- H. Manufacturer: Bodine "B50ST"

## 2.3 WALL-MOUNTED EMERGENCY LIGHTING UNIT

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**NOTE: Use wall-mounted emergency lighting units for indoor dry locations with a temperature range of 68 to 86 degrees F.**

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- A. Furnish a UL 924 listed, self-diagnostic, fully automatic, wall-mounted emergency lighting unit at each location indicated on the Drawings.
- B. Provide emergency lighting unit that is connectable for operation at either 120 or 277 volts.
- C. Provide emergency lighting unit that contains a 6 volt, maintenance-free, sealed lead-calcium battery. Upon interruption of normal AC power, or brownout conditions exceeding a 20% drop from nominal voltage, the internal controller shall automatically switch the emergency lighting load to the battery. Emergency power will be provided for a minimum of 90 minutes. During emergency operation, the battery shall be protected from deep discharge by a low-voltage battery disconnect circuit.
- D. Provide emergency lighting unit light source consisting of two adjustable heads each with a 7.2 watt wedge base T-5 lamp or equivalent.
- E. Provide emergency lighting unit with housing that is fabricated from UV stabilized high impact thermoplastic.
- F. Provide emergency lighting unit with a self-diagnostic system that meets the requirements of NFPA 101:
  - 1. Automatically perform a self-test of battery and lamps for at least 30 seconds at intervals not exceeding 30 days.
  - 2. Automatically perform a self-test of battery and lamps for at least 90 seconds at intervals not exceeding 6 months.
  - 3. Any failure shall be indicated by a status indicator.
- G. Provide emergency lighting unit that will perform self-timed tests that are manually initiated through the test button, including:
  - 1. Lamps and battery for at least 30 seconds.
- H. Emergency lighting unit shall provide exterior visual indication of AC power status, all self-diagnostic test cycles, and unit malfunctions including:
  - 1. Battery fault
  - 2. Charger fault
  - 3. Transfer fault

4. Lamp fault

- I. Provide a 5-year full warranty on unit emergency lighting equipment and a 2-year full warranty plus additional 4-year pro-rata warranty on the battery.
- J. Manufacturers: Prescolite "EDS2-CVS"
- K. Furnish cord and plug for emergency lighting unit as follows:
  - 1. 120 volt systems: white or gray 3-foot, SJT or SJTO, 3-conductor cord with a NEMA 15-5P plug.
  - 2. 277 volt systems: white or gray 3-foot, SJT or SJTO, 3-conductor cord with a NEMA L7-20P twistlock plug.

2.4 SEVERE-DUTY WALL-MOUNTED EMERGENCY LIGHTING UNIT

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**NOTE: Use severe-duty emergency lighting units for corrosive or very dusty locations with a temperature range of 68 to 86 degrees F. This product is NOT suitable for use in hazardous locations defined by NEC Article 500.**  
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- A. Furnish a UL 924 listed, self-diagnostic, fully automatic, severe duty, wall-mounted emergency lighting unit at each location indicated on the Drawings.
- B. Furnish a self-contained, fully automatic, severe duty emergency lighting unit at each location indicated on the Drawings.
- C. Provide severe duty emergency lighting unit that is connectable for operation at either 120 or 277 volts.
- D. Provide emergency lighting unit that contains a 6 volt, maintenance-free, sealed lead-calcium battery. Upon interruption of normal AC power, or brownout conditions exceeding a 20% drop from nominal voltage, the internal controller shall automatically switch the emergency lighting load to the battery. Emergency power will be provided for a minimum of 90 minutes. During emergency operation, the battery shall be protected from deep discharge by a low-voltage battery disconnect circuit.
- E. Provide severe duty emergency lighting unit light source consisting of two adjustable lamp heads each with a 7.2 watt wedge base T-5 lamp or equivalent.
- F. Provide severe duty emergency lighting unit housing that is fully gasketed, fiberglass-reinforced gray polyester that meets NEMA 1, 2, 4, 4X, and 12 requirements.
- G. Provide severe duty emergency lighting unit with a self-diagnostic system that meets the requirements of NFPA 101:
  - 1. Automatically perform a self-test of battery and lamps for at least 30 seconds at intervals not exceeding 30 days.

2. Automatically perform a self-test of battery and lamps for at least 90 seconds at intervals not exceeding 6 months.
  3. Any failure shall be indicated by a status indicator.
- H. Provide severe duty emergency lighting unit that will perform self-timed tests that are manually initiated through the test button, including:
1. Lamps and battery for at least 30 seconds.
- I. Emergency lighting unit shall provide exterior visual indication of AC power status, all self-diagnostic test cycles, and unit malfunctions including:
1. Battery fault
  2. Charger fault
  3. Transfer fault
  4. Lamp fault
- J. Manufacturer: Prescolite "N4XP2CVS-AX"
- K. Furnish cord and plug for emergency lighting unit as follows:
1. 120 volt systems: 3-foot, 3-conductor black or gray SO cordset with a NEMA 15-5P plug.
  2. 277 volt systems: 3-foot, 3-conductor black or gray SO cord with a NEMA L7-20P twistlock plug.

## 2.5 LED EXIT SIGN

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**NOTE: Use LED exit sign for indoor dry locations with a temperature range of 68 to 86 degrees F.**

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- A. Furnish a UL 924 listed, ENERGYSTAR® compliant, self-diagnostic, fully automatic, LED illuminated emergency exit sign at each location indicated on the Drawings.
- B. Provide exit sign with die cast housing, white finish, green stencil face letters, and universal mounting capability. Provide all necessary components for wall, ceiling, or end mounting applications.
- C. Provide single face or double face exit sign as indicated on the Drawings or as required for each location.

- D. Provide exit sign with a maintenance-free nickel-cadmium or nickel-metal hydride battery. Upon interruption of normal AC power, or brownout conditions exceeding a 20% drop from nominal voltage, the internal controller shall automatically switch the emergency lighting load to the battery. Emergency power will be provided for a minimum of 90 minutes. During emergency operation, the battery shall be protected from deep discharge by a low-voltage battery disconnect circuit.
- E. Provide exit sign with a self-diagnostic system that meets the requirements of NFPA 101.
  - 1. Automatically perform a self-test of battery and lamps for at least 30 seconds at intervals not exceeding 30 days.
  - 2. Any failure shall be indicated by a status indicator.
- F. Provide emergency lighting unit that will perform self-timed tests that are manually initiated through the test button, including:
  - 1. Lamps and battery for at least 30 seconds.
  - 2. Lamps and battery for at least 60 minutes.
- G. Exit sign shall provide exterior visual indication of AC power status, all self-diagnostic test cycles, and unit malfunctions including:
  - 1. Battery fault
  - 2. Charger fault
  - 3. Transfer fault
  - 4. Lamp fault
- H. Provide exit sign that is connectable for operation at either 120 or 277 volts.
- I. Provide a 5 year full warranty on LED exit signs.
- J. Manufacturers: Prescolite "DMX\_GEW".

## 2.6 SELF-LUMINOUS EXIT SIGN

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**NOTE: Use self-luminous exit signs only in special circumstances such as hazardous areas, very hot or cold locations, or in structures that do not have electricity but require exit signs.**

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- A. Furnish a UL listed self-luminous exit sign at each location indicated on the Drawings.

- B. Provide self-luminous exit sign that meets the following contrast and luminance requirements:
  - 1. Contrast Ratio: Not less than 0.5.
  - 2. Letters: A minimum luminance of 0.06 footlamberts as measured by a color-corrected photometer.
- C. Furnish self-luminous exit sign rated to maintain the required minimum luminance for not less than 20 years.
  - 1. Illumination: Caused by the interaction of tritium and phosphors contained in sealed Pyrex glass tubes.
  - 2. Color of Emitted Light: Yellow-green.
  - 3. Meets applicable Nuclear Regulatory Commission requirements.
- D. Provide single or double face self-luminous exit sign and directional arrows as indicated on the Drawings.
- E. Provide self-luminous exit sign with black plastic housing, green vinyl face, white letter strokes, and transparent polycarbonate cover.
- F. Provide mounting accessories suitable for each installation location.
- G. Manufacturers: Safety Light Corporation 2040-XX-20, Chloride C3-G-U-20-X-BK-PW.

## PART 3 PART 3 EXECUTION

### 3.1 EXISTING WORK

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#### **Edit to suit project requirements**

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- A. Disconnect and remove abandoned emergency lighting units, exit signs, lamps, and accessories as indicated on the Drawings.
- B. Extend existing emergency lighting and exit sign installations using materials and installation methods compatible with existing installations, or as specified.
- C. Clean and repair existing emergency lighting units and exit signs that are indicated as remaining or are to be reinstalled.
- D. Dispose of batteries in accordance with applicable LANL procedures. Arrange disposal of self-luminous exit signs with original unit manufacturer.



### 3.2 INSTALLATION

- A. Install emergency lighting system in accordance with NECA/IESNA 500, *Recommended Practice for Installing Indoor Commercial Lighting Systems* (ANSI), the NEC, manufacturer's instructions, and approved shop drawings. Have the manufacturer's installation instructions available at the construction site.
- B. Mount exit signs and unit emergency lights with bottom of fixture not less than 6'-8" or more than 12'-0" above finished floor.
- C. Connect fixtures to a branch circuit that serves the general lighting in the area and ahead of any local or remote switches. Self-luminous exit signs do not require an electrical circuit.
  - 1. For 120 volt wall-mounted emergency lights install a NEMA L15-5R single receptacle within 12 inches of the emergency light fixture location. Refer to Section 16140 - Wiring Devices.
  - 2. For 277 volt wall-mounted emergency lights install a NEMA L7-20R single receptacle within 12 inches of the emergency light fixture location. Refer to Section 16140 - Wiring Devices.

### 3.3 ADJUSTING

- A. Aim lamps on wall-mounted emergency lighting units to obtain the following illumination of exit pathway:
  - 1. 1 ft-candle average
  - 2. 0.1 ft-candle minimum
  - 3. Maximum-to-minimum uniformity ratio not exceeding 40 to 1.
- B. Test emergency lighting equipment in accordance with the manufacturer's instructions and NECA/IESNA 500.

END OF SECTION

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**NOTE TO DESIGNER:** The luminaire schedule on the Drawings should contain the following information:

1. Fixture type designation (e.g. "X").
2. Description of fixture (e.g. "LED stencil-face emergency exit sign").
3. Description of finish (e.g. "Baked white enamel finish").
4. Description of lens or louver (e.g. "Green plastic lens").
5. Description of ballast if applicable (e.g. "277V electronic ballast").
6. Description and quantity of lamps (e.g. "Green LED lamps").
7. Description of accessories: (e.g. 3 foot white cord with "NEMA L7-20P plug").
8. Manufacturer and catalog number (e.g. "XYZ #123456-7890").

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Do not delete the following reference information:

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This project specification is based on LANL Construction Specification 16530, Rev. 0, dated March 24, 2003.